PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference O.Z. 6241-WO	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP2004/050992	International filing date *(day/month/year)* 02.06.2004	Priority date *(day/month/year)* 28.07.2003
International Patent Classification (IPC) or both national classification and IPC C08F220/10		
Applicant DEGUSSA AG		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of ~~3~~ 5 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand 09.02.2005	Date of completion of this report 04.11.2005
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Schmidt, H Telephone No. +31 70 340-2461

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP2004/050992

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1, 2, 5-12	as originally filed
3, 4	received on 24.05.2005 with letter of 20.05.2005

Claims, Numbers

1-11	received on 24.05.2005 with letter of 20.05.2005

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☒ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

   see separate sheet

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-11
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-11
Industrial applicability (IA)	Yes:	Claims	1-11
	No:	Claims	

2. Citations and explanations

see separate sheet

Box I

1. The following documents are referred to in the present report; the numbering will be adhered to the entire procedure

D1 EP-A-1172412
D2 EP-A-1045009
D3 US-A-5753733

1.1 This report has been established as if some of the amendments had not been made since they have been considered to go beyond the disclosure as filed (Rule 70.2 (c) PCT)

The amendment concerned is the replacement of "...alkyl group having 1 to 18 carbon atoms" by "...alkyl group having 1 to 6 carbon atoms" in claim 1 and on pages 3 and 4. The upper limit "6" of a subrange of the range of 1-18 carbon atoms is not disclosed in the application. Alkyl groups with 6 carbon atoms are only disclosed for n-hexyltrimethoxysilane. Other C_6 alkylgroups like dimethylbutyl are not disclosed in the application. The generalisation from one member of C_6 alkylgroups to all others is not allowable acc. Rule 70.2(c) PCT.

Box V

2. Present claims 1-11 appear not to be novel in the sense of Art. 33(2) PCT

2.1 Subject matter of claim 1 is a dispersion prepared from monomers (I) and (II) or (III). The claim is to be regarded as a product, the dispersion produced by a process of incorporating a mixture of monomers (I)-(III) into a polymer framework. All polymers comprising monomers (I)-(III) hence are novelty destroying regardless of their preparation

2.2.1 D1 discloses polymers containing acryl substituted siloxane monomers in table 1 and 4. However, the list for monomer C in paragraph [0079] also discloses vinyltrimethoxysilane (see also present claim 5). Selecting the monomer of the list of paragraph [0079] and replacing it for the acrylic monomers of table 1 discloses the present claim. Claim 1 hence still is novelty destroying.

2.2.2 Similarily, corresponding polymers are known from D2, reference example 1 in

combination with paragraph [0023]

2.2.3 D3 discloses octyltriethoxysilane in example 1. However, column 4, line 30 of D3 also discloses vinyltrimethoxysilane

2.3 The subject matter of claims 2-11 is disclosed in each of D1, D2 or D3. Regarding claim 7, the applicant is reminded that also a monomer is regarded as "precursor stage". Nevertheless, if the applicant intended to direct the claim to a oligomeric or polymeric monomer, the claim would not be novel over D3, which includes (polymeric) PVOH in the dispersion

3. Present claims 1-11 appear not to be inventive in the sense of Art. 33(3) PCT

3.1 The problem to be solved by the present claims seems to prepare polymer dispersion leading to improved coatings. Since D1-D3 disclose the same dispersions, it can be expected that they likewise solve the problem. The present claims hence are not inventive

The present application does not present comparative examples showing a technical effect of the monomers chosen over other, like acrylic, monomers. A selection of specific monomers hence would lack an inventive step since they only solve the problem of preparing an alternative polymer of different monomers which are apparently suitable for the purpose of preparing the inventive polymers.

components of a physical mixture comprising

(i) at least one unsaturated silane of the general formula (I)

$$[H_2C=CX(Y)_n]Si(CH_3)_p(R)_{3-p} \qquad (I),$$

in which X is a hydrogen atom or a methyl group, Y is a divalent $-CH_2-$ group, n is 0 or 1, R is an alkoxy group selected from methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy, and 2-methoxyethoxy, and p is 0 or 1,

and

(ii) at least one organic silane of the general formula (II)

$$R^1Si(CH_3)_q(R^2)_{3-q} \qquad (II),$$

in which R^1 is a linear, branched or cyclic alkyl group having 1 to 6 carbon atoms or is an aryl group or is a polyether group, R^2 is an alkoxy group selected from methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy and 2-methoxyethoxy, and q is 0 or 1,

and/or at least one silicic ester of the general formula (III)

$$Si(R^3)_4 \qquad (III),$$

in which groups R^3 are identical or different and R^3 is an alkoxy group selected from methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy and isobutoxy,

are incorporated into the framework of the polymer.

The present invention further provides a process for preparing polymer dispersions

which involves

- mixing at least one monomer and components (i) and (ii),
- dispersing the resulting mixture in surfactant-containing water, and
- then carrying out the polymerization.

The monomer, i.e. the precursor compound of the polymer framework, used in the process of the invention is preferably methyl methacrylate, butyl acrylate, butyl methacrylate, acrylic acid, vinyl alcohol, vinyl acetate or a mixture of at least two or more of the aforementioned monomers.

Furthermore, as component (i) it is preferred to employ vinyltrimethoxysilane, vinyltriethoxysilane, vinyltri(2-methoxyethoxy)silane, vinylmethyldimethoxysilane, vinylmethyldiethoxysilane or a mixture of two or more of the aforementioned silanes.

In addition it is preferred as component (ii) to employ methyltrimethoxysilane, n-propyltrimethoxysilane, n-propyltriethoxysilane, n-propyltri(2-methoxyethoxy)silane, isobutyltrimethoxysilane, isobutyltriethoxysilane, n-hexyltrimethoxysilane, phenyltrimethoxysilane, phenyltriethoxysilane, tetraethoxysilane, alkyl polyglycol propyltrimethoxysilane or a mixture of two or more of the aforementioned silanes.

Used additionally in the process of the invention is preferably from 0.1 to 10% by weight, in particular from 1 to 2% by weight, of unsaturated silane, based on the total amount of the monomers.

The weight ratio of components (i) and (ii) used in the process of the invention is

What is claimed is:

1. A polymer dispersion wherein the components of a physical mixture comprising

(i) at least one unsaturated silane of the general formula (I)

$$[H_2C=CX(Y)_n]Si(CH_3)_p(R)_{3-p} \qquad (I),$$

in which X is a hydrogen atom or a methyl group, Y is a divalent $-CH_2-$ group, n is 0 or 1, R is an alkoxy group selected from methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy, and 2-methoxyethoxy, and p is 0 or 1,

and

(ii) at least one organosilane of the general formula (II)

$$R^1Si(CH_3)_q(R^2)_{3-q} \qquad (II),$$

in which R^1 is a linear, branched or cyclic alkyl group having 1 to 6 carbon atoms or is an aryl group or is a polyether group, R^2 is an alkoxy group selected from methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy and 2-methoxyethoxy, and q is 0 or 1,

and/or at least one silicic ester of the general formula (III)

$$Si(R^3)_4 \qquad (III),$$

in which groups R^3 are identical or different and R^3 is an alkoxy group selected from methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy and isobutoxy,

are incorporated into the framework of the polymer.

2. A process for preparing a polymer dispersion as claimed in claim 1, which comprises
   - mixing at least one monomer and components (i) and (ii),
   - dispersing the mixture in surfactant-containing water, and
   - then carrying out the polymerization.

3. A process as claimed in claim 2,
   wherein
   from 0.1 to 10% by weight of unsaturated silane (i) is used, based on the total amount of the monomers.

4. A process as claimed in claim 2 or 3,
   wherein
   component (i) is used in a weight ratio to component (ii) of from 99.9:0.1 to 0.1:99.9.

5. A process as claimed in any of claims 2 to 4,
   wherein
   an unsaturated silane selected from vinyltrimethoxysilane, vinyltriethoxysilane, vinyltri(2-methoxyethoxy)silane, vinylmethyldimethoxysilane, vinylmethyldiethoxysilane or a mixture of two or more of the aforementioned silanes is used as component (i).

6. A process as claimed in any of claims 2 to 5,
   wherein
   an organosilane selected from methyltrimethoxysilane, n-propyltrimethoxysilane, n-propyltriethoxysilane, n-propyltri(2-methoxyethoxy)silane, isobutyltrimethoxysilane, isobutyltriethoxysilane, n-hexyltrimethoxysilane, phenyltrimethoxysilane, phenyltriethoxysilane, tetraethoxysilane, alkyl polyglycol

propyltrimethoxysilane or a mixture of two or more of the aforementioned silanes is used as component (ii).

7. A process as claimed in any claims 2 to 6, wherein a precursor stage of a polymer selected from polyacrylates, polymethacrylates, polystyrene acrylates, polyvinyl alcohols, and polyvinyl acetates is used as monomer.

8. A polymer dispersion obtainable as claimed in any of claims 2 to 7.

9. The use of a physical mixture of components (i) and (ii) as claimed in claim 1 for preparing a polymer dispersion.

10. The use of a polymer dispersion as claimed in any of claims 1 to 8 in a concrete primer, in an adhesive or sealant or in an ink or paint.

11. An article prepared using a polymer dispersion as claimed in any of claims 1 to 10.